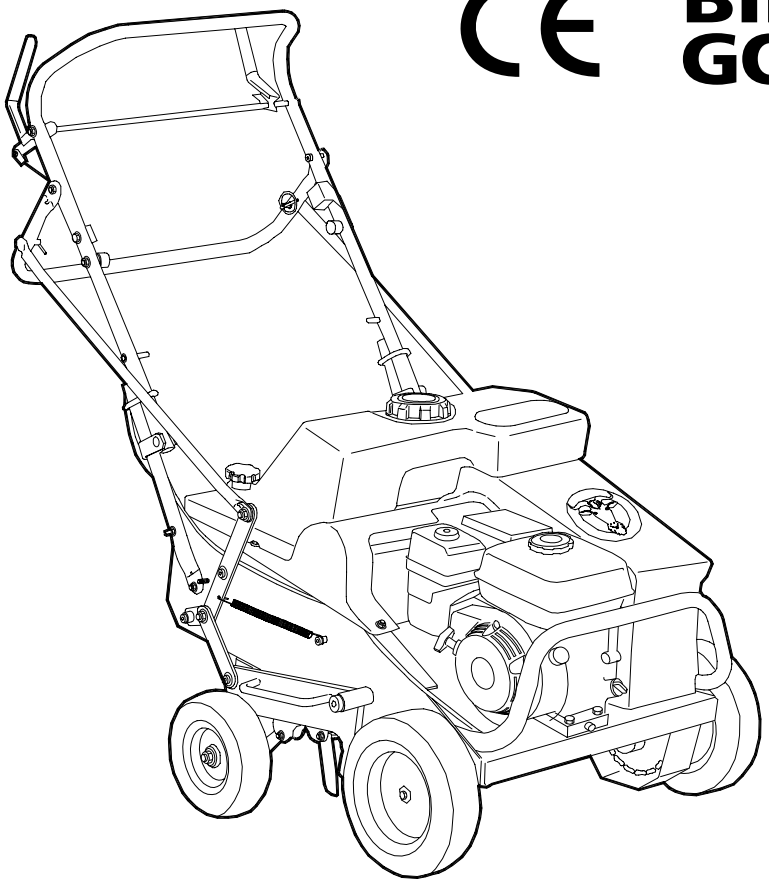
1



U.S. PATENT #6,758,283 and other patents pending

Thank You for Selecting
The Powerful
AERATOR

Operator Owner's Manual

AE400H & AE450

3

Specifications

	AE400H	AE450
ENGINE: H.P.	4.0 (2.98 kW)	5.5 (4.1 kW)
ENGINE: TYPE	HONDA OHV	BRIGGS OHV
ENGINE: FUEL CAP.	2.1 qt. (2.0 L)	3.0 qt. (2.84 L)
ENGINE: OIL CAP.	0.63 qt. (0.6 L)	0.66 qt. (0.62 L)
UNIT WEIGHT	242# (109.8 kg)	244# (110.7 kg)
WEIGHT: SHIPPING	274# (124.3 kg)	276# (125.2 kg)
MAX. ENGINE OPERATING SLOPE	20°	15°

5 IN THE INTEREST OF SAFETY

BEFORE STARTING ENGINE, READ AND UNDERSTAND THE "ENTIRE OPERATOR'S MANUAL & ENGINE MANUAL."

THIS SYMBOL MEANS WARNING OR CAUTION. DEATH, PERSONAL INJURY AND/OR PROPERTY DAMAGE MAY OCCUR UNLESS INSTRUCTIONS ARE FOLLOWED CAREFULLY.

WARNING: The Engine Exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

WARNING: DO NOT

1. **DO NOT** run engine in an enclosed area. Exhaust gases contain carbon monoxide, an odorless and deadly poison.

2. **DO NOT** place hands or feet near moving or rotating parts.

3. **DO NOT** store, spill or use gasoline near an open flame, or devices such as a stove, furnace, or water heater which use a pilot light or devices which can create a spark.

4. **DO NOT** refuel indoors where area is not well ventilated. Outdoor refueling is recommended.

5. **DO NOT** fill fuel tank while engine is running. Allow engine to cool for 2 minutes before refueling. Store fuel in approved safety containers.

6. **DO NOT** remove fuel tank cap while engine is running.

7. **DO NOT** operate engine when smell of gasoline is present or other explosive conditions exist.

8. **DO NOT** operate engine if gasoline is spilled. Move machine away from the spill and avoid creating any ignition until the gasoline has evaporated.

9. **DO NOT** transport unit with fuel in tank.

10. **DO NOT** smoke when filling fuel tank.

11. **DO NOT** choke carburetor to stop engine. Whenever possible, gradually reduce engine speed before stopping.

12. **DO NOT** run engine at excessive speeds. This may result in injury & /or damage to unit.

13. **DO NOT** tamper with governor springs, governor links or other parts which may change the governed engine speed.

14. **DO NOT** tamper with the engine speed selected by the engine manufacturer.

15. **DO NOT** check for spark with spark plug or spark plug wire removed. Use an approved tester.

16. **DO NOT** crank engine with spark plug removed. If engine is flooded, place throttle in "FAST" position and crank until engine starts.

17. **DO NO**T strike flywheel with a hard object or metal tool as this may cause flywheel to shatter in operation. Use proper tools to service engine.

18. **DO NOT** operate engine without a muffler. Inspect periodically and replace, if necessary. If engine is equipped with muffler deflector, inspect periodically and replace, if necessary, with correct deflector.

19. **DO NOT** operate engine with an accumulation of grass, leaves, dirt or other combustible material in the muffler area.

20. **DO NOT** use this engine on any forest covered, brush covered, or grass covered unimproved land unless a spark arrester is installed on the muffler. The arrester must be maintained in effective working order by the operator. In the State of California the above is required by law (Section 4442 of the California Public Resources Code). Other states may have similar laws. Federal laws apply on federal lands.

21. **DO NO**T touch hot muffler, cylinder, or fins because contact may cause burns.

22. **DO NOT** run engine without air cleaner or air cleaner cover.

23. **DO NOT** operate during excessive vibration!

24. **DO NOT** leave machine unattended while in operation.

25. **DO NOT** park machine on a steep grade or slope.

WARNING: DO

1. **ALWAYS DO** remove the wire from the spark plug when servicing the engine or equipment TO PREVENT ACCIDENTAL STARTING.

2. **DO** keep cylinder fins and governor parts free of grass and other debris which can affect engine speed.

3. **DO** pull starter cord slowly until resistance is felt. Then pull cord rapidly to avoid kickback and prevent hand or arm injury.

4. **DO** examine muffler periodically to be sure it is functioning effectively. A worn or leaking muffler should be repaired or replaced as necessary.

5. **DO** use fresh gasoline. Stale fuel can gum carburetor and cause leakage.

6. **DO** check fuel lines and fittings frequently for cracks or leaks. Replace if necessary

7. **Follow** engine manufacturer operating and maintenance instructions.

8. **Inspect** machine and work area before starting unit.

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7 SOUND

SOUND TESTS

Sound tests conducted were in accordance with 2000/14/EEC and were performed on 03/13/2004 under the conditions listed:

L_{WA}

95 dB

GENERAL CONDITION: Clear

TEMPERATURE: 48°F (9 °C)

WIND SPEED: 0.4 MPH (0.65 kmh)

WIND DIRECTION: East

HUMIDITY: 31.3 %

BAROMETRIC PRESSURE: 30.29" Hg (769 mm Hg)

8 VIBRATION

VIBRATION LEVELS 1.2 g max.

Vibration levels at the operators handles were measured in the vertical, lateral, and longitudinal directions using calibrated vibration test equipment. Tests were performed on 03/13/2004 under the conditions listed:

GENERAL CONDITION: Clear

TEMPERATURE: 48°F (9 °C)

WIND SPEED: 0.4 MPH (0.65 kmh)

WIND DIRECTION: East

HUMIDITY: 31.3 %

BAROMETRIC PRESSURE: 30.29" Hg (769 mm Hg)

9 GENERAL SAFETY

For your safety and the safety of others, these directions should be followed:

Do not operate this machine without first reading owner's manual and engine manufacturer's manual.

Use of Ear Protection is recommended while operating this machine.

Use of Eye and Breathing protection is recommended when using this machine, especially in dry and dusty conditions.

Wearing gloves is recommended while operating this machine.

·**DO NOT** place hands or feet underneath unit, near debris outlet or near any moving parts.
·**DO NOT** start engine without tine height adjust lever in up position and clutch bail disengaged.
·**DO NOT** start or operate machine with guards removed.
·**DO NOT** perform any service on the unit without removing the spark plug wire.
·**DO NOT** operate a machine that exhibits excessive vibration.
·**DO NOT** operate this machine on slopes greater than 19°.
·**DO NOT** use this unit on any surface other than grass lawns.
·**DO NOT** allow children to operate this equipment.

-**DO** read all maintenance and operating instructions before begining work.
-**DO** read all engine manufacturers operating and maintenance instructions.
-**DO** inspect lawn before begining work. Remove all rocks, wire, string, or other objects that can present a hazard during work prior to starting.
-**DO** identify and mark all fixed objects to be avoided during work, such as sprinkler heads, water valves, buried cables, or clothes line anchors, etc.

10 ASSEMBLY

Read all safety and operating instructions before assembling or starting this unit.

PUT OIL IN ENGINE BEFORE STARTING

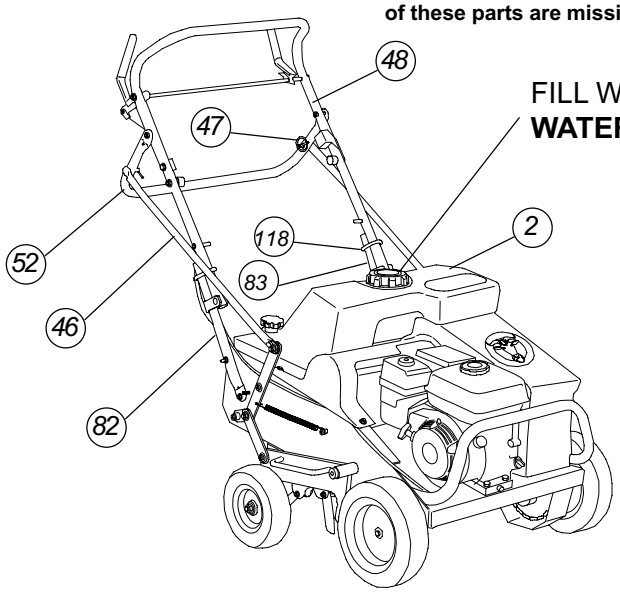
Your Billy Goat aerator is shipped from the factory in one carton.

1. **HONDA:** Unfold the upper handle (item 48) and slide handle lock loops (item 118) into place to secure the upper handle to the lower handle (item 82 & 83).
1. **BRIGGS** Remove the bolts and nuts that are shiped in the upper handle. While holding the lock loops on the handle use the bolts and nuts removed above to attach the upper handle to the hinge bracket on the lower handles and tighten nut against the bracket. NOTE: DO not overtighten. The handle should be free to rotate for folding.

2. **PIVOT** the lift rod (item 46), insert the pin through the lift handle (item 52) then lock in place with lynch pin (item 47). Repeat same steps on other side.
3. **FILL** the water tank (item 2) to desired weight with water ONLY..
4. **CHECK** engine oil level and fill to proper level. Also check oil in gear reduction reservoir and fill if necessary. See engine owners manual for type and amount of oil to use. Move the tine engagement lever to the down position, to level engine during checking.
5. **CONNECT** spark plug wire. Set the engine stop switch to the **ON** position. You will use the stop switch on the handle during operation.

11 PACKING CHECKLIST

These items should be included in your carton. If any of these parts are missing, contact your dealer.



Per Model

Engine Manual Per Model

Check ☐ **HONDA 4.O OHV**

Check ☐ **B&S 5.5 Intek**

Literature Assembly 360177

Check ☐ **Owner's Manual 360251**

☐ **Warranty Card 400972**

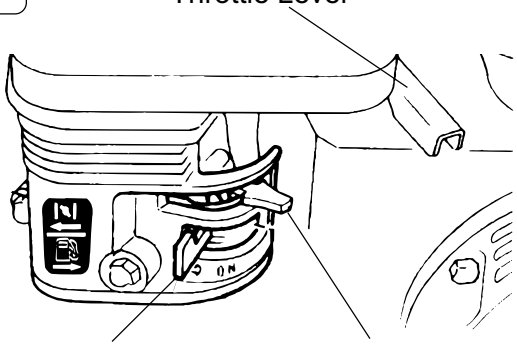
Check ☐ **EU Declaration of Conformity & EU Distributor List 360194**

13 CONTROLS

ENGINE SPEED CONTROL

Honda

Throttle Lever

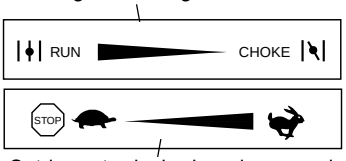


FUEL VALVE
(shown in the **CLOSED** position)

CHOKE LEVER
(shown in **RUN** position)

Briggs

Set lever to choke position when starting a cold engine

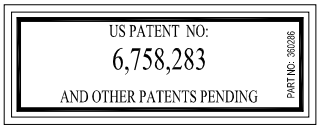


Set lever to desired engine speed.
Move lever completely to the left to stop engine

14 INSTRUCTION LABELS

These labels should be included on your Aerator. If any of these labels are damaged, replace them before putting this equipment into operation. Item and part numbers are given to help in ordering replacement labels.

Label Hot Engine
Part No.400268

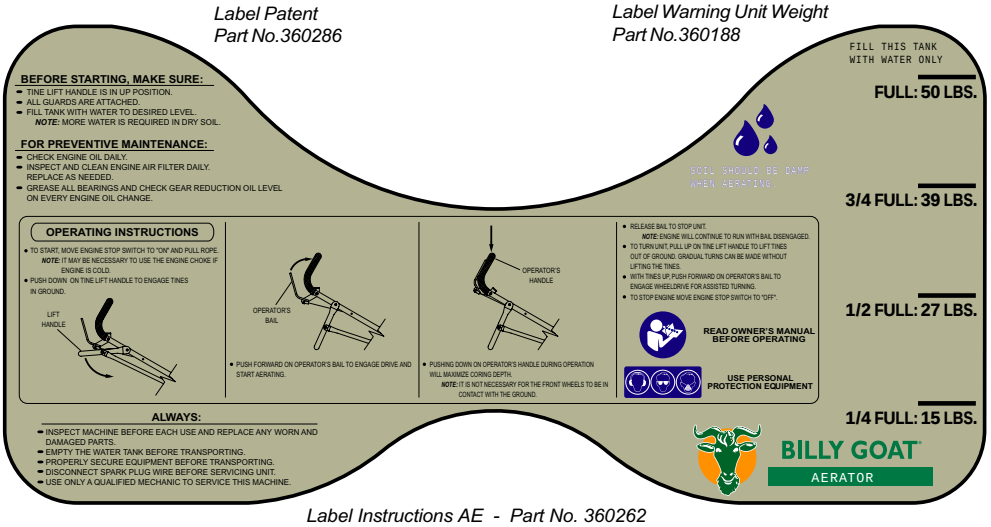


Label Patent
Part No.360286

Label Warning Unit Weight
Part No.360188

Label Danger Guard
Part No.900327

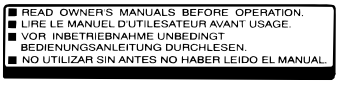
Label LIFT HERE
Part No.360187


BEFORE STARTING, MAKE SURE:
TINE LIFT HANDLE IS IN UP POSITION.
ALL GUARDS ARE ATTACHED.
FILL TANK WITH WATER TO DESIRED LEVEL.
NOTE: MORE WATER IS REQUIRED IN DRY SOIL.
FOR PREVENTIVE MAINTENANCE:
CHECK ENGINE OIL DAILY.
INSPECT AND CLEAN ENGINE AIR FILTER DAILY. REPLACE AS NEEDED.
GREASE ALL BEARINGS AND CHECK GEAR REDUCTION OIL LEVEL ON EVERY ENGINE OIL CHANGE.
OPERATING INSTRUCTIONS
TO START, MOVE ENGINE STOP SWITCH TO "ON" AND PULL ROPE.
NOTE: IT MAY BE NECESSARY TO USE THE ENGINE CHOKE IF ENGINE IS COLD.
PUSH DOWN ON TINE LIFT HANDLE TO ENGAGE TINES IN GROUND.
LIFT HANDLE
OPERATOR'S BAIL
PUSH FORWARD ON OPERATOR'S BAIL TO ENGAGE DRIVE AND START AERATING.
OPERATOR'S HANDLE
PUSHING DOWN ON OPERATOR'S HANDLE DURING OPERATION WILL MAXIMIZE CORING DEPTH.
NOTE: IT IS NOT NECESSARY FOR THE FRONT WHEELS TO BE IN CONTACT WITH THE GROUND.
RELEASE BAIL TO STOP UNIT.
NOTE: ENGINE WILL CONTINUE TO RUN WITH BAIL DISENGAGED.
TO TURN UNIT, PULL UP ON TINE LIFT HANDLE TO LIFT TINES OUT OF GROUND. GRADUAL TURNS CAN BE MADE WITHOUT LIFTING THE TINES.
WITH TINES UP, PUSH FORWARD ON OPERATOR'S BAIL TO ENGAGE WHEELDRIVE FOR ASSISTED TURNING.
TO STOP ENGINE MOVE ENGINE STOP SWITCH TO "OFF".
READ OWNER'S MANUAL BEFORE OPERATING
USE PERSONAL PROTECTION EQUIPMENT
ALWAYS:
INSPECT MACHINE BEFORE EACH USE AND REPLACE ANY WORN AND DAMAGED PARTS.
EMPTY THE WATER TANK BEFORE TRANSPORTING.
PROPERLY SECURE EQUIPMENT BEFORE TRANSPORTING.
DISCONNECT SPARK PLUG WIRE BEFORE SERVICING UNIT.
USE ONLY A QUALIFIED MECHANIC TO SERVICE THIS MACHINE.
FILL THIS TANK WITH WATER ONLY
FULL: 50 LBS.
SOIL SHOULD BE DAMP WHEN AERATING.
3/4 FULL: 39 LBS.
1/2 FULL: 27 LBS.
1/4 FULL: 15 LBS.
BILLY GOAT
AERATOR

Label Instructions AE - Part No. 360262

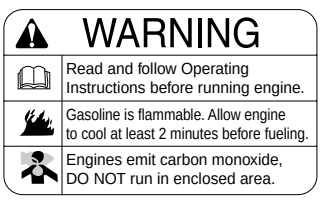
15 ENGINE LABELS

Honda


READ OWNER'S MANUALS BEFORE OPERATION.
LIRE LE MANUEL D'UTILESATEUR AVANT USAGE.
VOR INBETRIEBNAHME UNBEDINGT BEDIENUNGSANLEITUNG DURCHLESEN.
NO UTILIZAR SIN ANTES NO HABER LEIDO EL MANUAL.

IMPORTANT ENGINE INFORMATION HONDA MOTOR CO. LTD
ENGINE FAMILY THN163U1G1RA DISPLACEMENT - 163cm
TUNE UP SPECIFICATION "REFER TO OWNER'S MANUAL FOR
MAINTENCE SPECIFICATIONS AND ADJUSTMENTS": THIS ENGINE
MEETS 1995 CALIFORNIA EMISSION REGULATIONS FOR
UTILITY AND LAWN AND GARDEN EQUIPMENT ENGINES
EM
TE

Briggs


WARNING
Read and follow Operating Instructions before running engine.
Gasoline is flammable. Allow engine to cool at least 2 minutes before fueling.
Engines emit carbon monoxide, DO NOT run in enclosed area.

16 Operation

INTENDED USE: This machine is designed for aerating established lawns and large grass covered areas. The machine should not be used for any other purpose than that stated above.

DO NOT operate if excessive vibration occurs. If excessive vibration occurs, shut engine off immediately and check for damaged or worn tine reel, loose pulley bolts or set screws, loose engine or lodged foreign objects. (See trouble shooting section on page 12).

Like all mechanical tools, reasonable care must be used when operating machine.

Inspect machine work area and machine before operating. Make sure that all operators of this equipment are trained in general machine use and safety.

STARTING ENGINE

ENGINE: See engine manufacturer's instructions for type and amount of oil and gasoline used. Engine must be level when checking and filling oil and gasoline.

GEAR REDUCTION: See engine manufacturer's instructions for type and amount of oil used. Engine must be level when checking and filling the gear reduction case. The engine is shipped from the factory with oil in the gear case. It should be checked before first use.

ENGINE SPEED: Controlled by lever on the engine. Under normal conditions, operate at the minimum throttle speed to accomplish your task.

NOTE: The unit ground speed varies with the engine speed.

FUEL VALVE: Move fuel valve to "ON" position
Honda: Located below the air cleaner on the engine.

CHOKE: Engage the choke when starting a cold engine.
Honda: Located below the air cleaner on the engine.

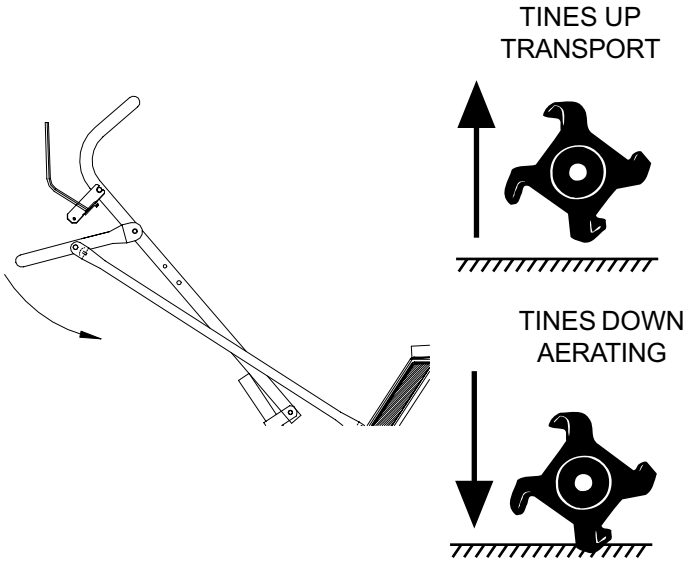
THROTTLE: Move the throttle control lever on the engine to fast position. Pull starting rope to start engine.

IF YOUR UNIT FAILS TO START:
See Troubleshooting on page 12.

NOTE: Honda engines are equiped with a low oil sensor to prevent engine damage. When it senses a low oil condition (i.e. unit is operating or sitting on a steep slope) the engine shuts down. The low oil condition must be corrected before the engine can be restarted. See the engine owners manual for more information.

TINES RAISING/LOWERING

The tines are raised or lowered into the ground by operating the tine engagement lever on the upper handle. Tine penetration is very dependent on surface preparation. READ the operation section before aerating.



AERATING OPERATION

DO NOT- Use this machine on any surface other than a lawn or similar area.
DO NOT- Use this machine on slopes in excess of 20°.
DO NOT- Allow persons unfamiliar with this equipment to operate it.
DO NOT- Allow children to operate this equipment.

MOW: Mow the lawn to it's normal cut height.

WATER: For the best performance and maximum tine penetration the lawn should be thoroughly watered the day before aeration.

INSPECT lawn before begining work. Remove all rocks, wire, string, or other objects that can present a hazard during work prior to starting.

IDENTIFY and mark all fixed objects to be avoided during work, such as sprinkler heads, water valves, buried cables, or clothes line anchors, etc.

START ENGINE: See above.

SET SPEED: The ground speed of your aerator varies with the engine speed. Set the engine at approximately half throttle to start. Speed may be increased based on the turf conditions (i.e. large flat areas) and operator experience. Speed should be lowered when operating under adverse turf conditions (i.e. fenced areas, hills, or slopes).

MOVE: Be sure the tine engagement control is in the up position (tines out of the ground) and engage the wheel drive by squeezing the operators clutch bail against the handle. Transport the aerator to the work area.

AERATOR OPERATION CON'T

ENGAGE TINES: With the aerator in the work area, release the clutch bail and push forward on the tine engagement lever, lowering the tines into the dirt.

AERATE: Engage the operators clutch bail by pushing it forward to the handle, and start aerating.
NOTE: For maximum tine penetration apply downward pressure on the handle.

TURNING: At the end of an aerating run, release the clutch bail and lift up on the tine engagement control to lift the tines out of the ground. Using the handle lift the front of the unit to pivot it around and line up for the next pass.

TRANSPORT: Be sure to lift the tine engagement lever (tines out of the ground) before transporting away from the work area.

HANDLING & TRANSPORTING

CAUTION: This unit is heavy. It requires at least two people to lift it.

REMOVE: The aerator is equiped with a water tank as weight. Drain the water using drain valve before loading and unloading the unit. The tank can be removed by loosening the knob holding the tank. See Fig. 1 below.
NOTE: The water tank is also heavy (up to 50 lbs.) when it is full of water. The tank should be drained then handled carefully and secured in place during transport.

LIFTING: The aerator is equiped with lift handles. After removing the weight lift the unit with two people one on each side of the unit. Grip the unit at the points marked "LIFT HERE" when lifting. Lift using your legs and not your back. See Fig. 2

USING RAMPS: Use ramps that are of adequate strength for a unit of this weight. When loading the aerator using ramps be sure the ramp is not too steep and that the surface of the ramp provides good traction.

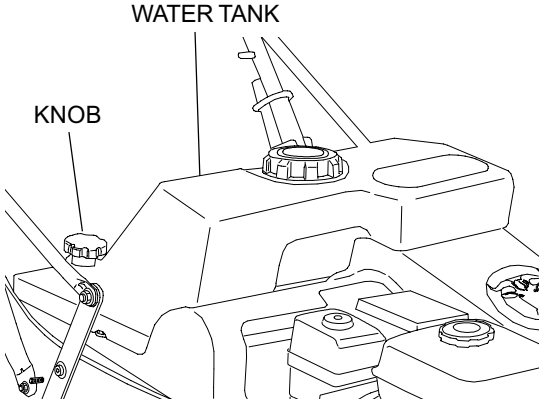


Fig. 1

Hints! AERATING TIPS

WATER: For the best performance and maximum tine penetration, the lawn should be thoroughly watered the day before aeration.

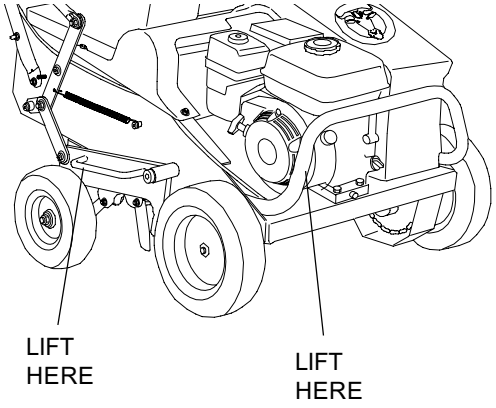
SLOPES: Do not operate the aerator on steep slopes. Use extreme caution when operating on any sloped surface. For lesser sloped areas operate the unit, traversing up and down at a 45 degree angle to the slope rather than straight across. Extended operation on steep slopes can cause engine damage.

NOTE: DO NOT release the operators clutch bail when operating on a slope. This will allow the unit to free wheel and allow the unit to roll down the slope.

NOTE: Honda engines are equiped with a low oil sensor to prevent engine damage. When it senses a low oil condition (i.e. unit is operating or sitting on a steep slope) the engine shuts down. The low oil condition must be corrected before the engine can be restarted. See the engine owners manual for more information.

TINE PENETRATION: Maximum tine penetration is achieved by applying downward pressure on the handle during operation.

TURNING: At the end of a pass the tines can be lifted out of the ground to turn by lifting straight up on the operators handle.



IT TAKES AT LEAST TWO PEOPLE, ONE ON EACH SIDE OF THE UNIT.

Fig. 2

ADJUSTING HANDLE HEIGHT

This unit is equipped with a height adjustable upper handle to allow for multiple operator heights.
TO ADJUST THE HANDLE HEIGHT:
1. Remove the lock nuts (item 50) that secure the handle, one on each side, to the lower handle mounting studs.
2. Loosen the handle mounting bolts (item 51), one on each side, (See Fig. 3) and push the handle out and away from the lower handle mounting studs.
3. The handle is now free to rotate. Adjust the handle to the desired height. The BOTTOM handle mounting stud coresponds with the highest handle position. The TOP handle mounting stud coresponds with the lowest handle mounting position.
4. Completely tighten the handle mounting bolts (item 51), and replace the lock nuts (item 50) to secure the handle in place.

FOLDING HANDLE

This unit is equipped with a folding upper handle for easier storage.
TO FOLD THE HANDLE (See Fig. 4) :
1. Remove the latch pin (item 47) from the lift rod (item (46).
2. Remove the lift rod from the lift handle (item 52) then pivot the lift rod toward the front of the unit. Repeat same steps on other side.
3. Slide handle lock loops (item 118) and secure on the loop pin (item 53). Repeat same steps on other side.
4. Fold the upper handle (item 48).

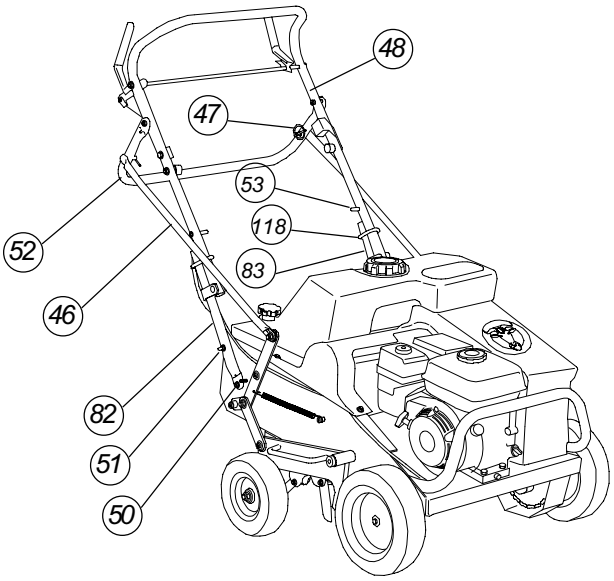


Fig. 3

UNIT STORAGE

⚠ Never store engine indoors or in enclosed poorly ventilated areas with fuel in tank, where fuel fumes may reach an open flame, spark or pilot light, as on a furnace, water heater, clothes dryer or other gas appliance.

If engine is to be unused for 30 days or more, prepare as follows:
⚠ Remove all gasoline from carburetor and fuel tank to prevent gum deposits from forming on these parts and causing possible malfunction of engine. Drain fuel outdoors, into an approved container, away from open flame. Be sure engine is cool. Do not smoke. Run engine until fuel tank is empty and engine runs out of gasoline.
NOTE: Fuel stabilizer (such as Sta-Bil) is an acceptable alternative in minimizing the formation of fuel gum deposits during storage. Add stabilizer to gasoline in fuel tank or storage container. Always follow mix ratio found on stabilizer container. Run engine at least 10 min. after adding stabilizer to allow it to reach the carburetor.

PARKING

⚠ NEVER PARK THIS UNIT ON A SLOPE OF ANY KIND. Always keep tines in the up position when parking the unit.

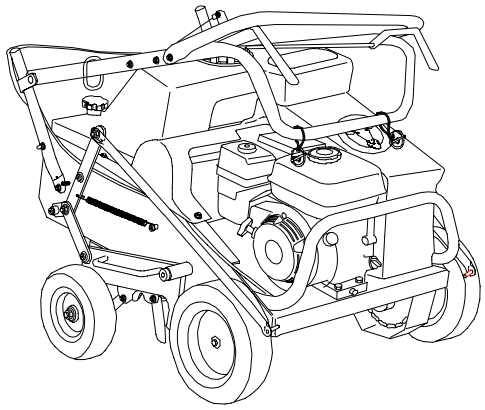
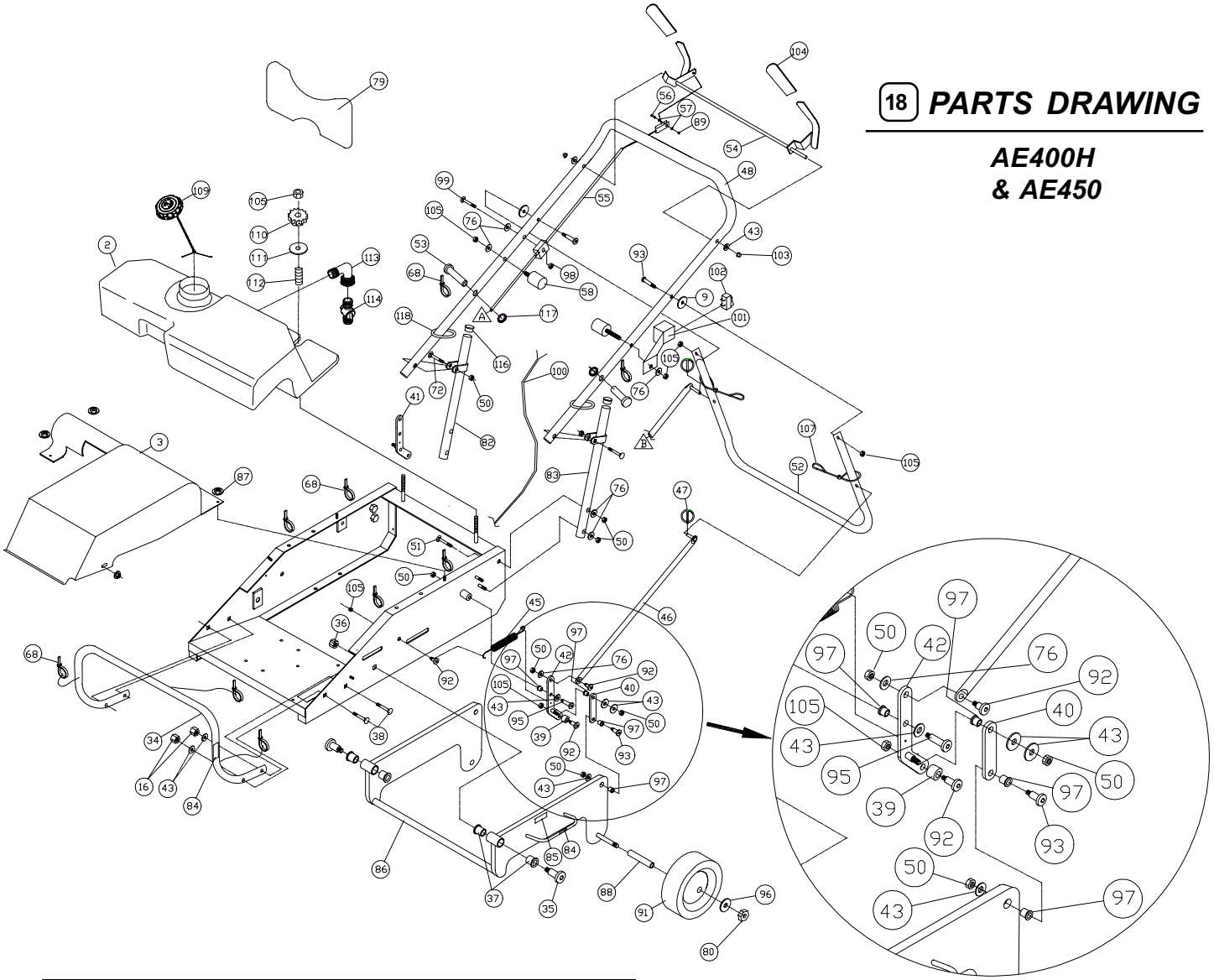


Fig. 4

18 PARTS DRAWING

AE400H & AE450

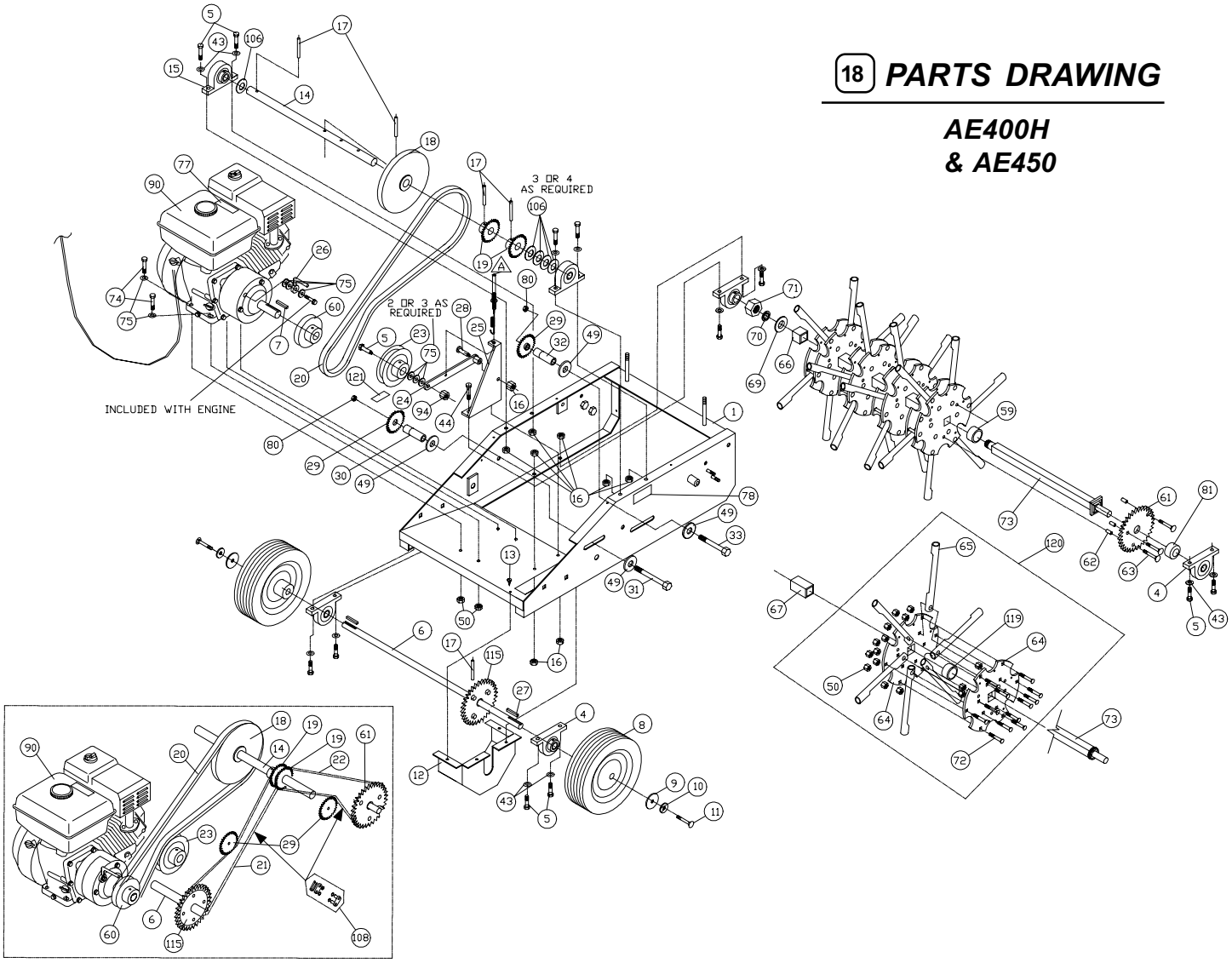


ITEM NO.	DESCRIPTION	AE400H Part No.	QTY	AE450 Part No.	QTY
2	WATER TANK 5.5 GAL	360238	1	360238	1
3	GUARD DRIVE COVER	360280	1	360291	1
9	WASHER 5/16 FENDER	8172020	2	8172020	2
16	NUT LOCK 3/8-16	8160003	4	8160003	4
34	TUBE FRONT BUMPER	360254	1	360254	1
35	BOLT SHOULDER 3/4 x 2.5	360146	2	360146	2
36	NUT LOCK 5/8-11 THIN	8161046	2	8161046	2
37	BUSHING PIVOT	360183	4	360183	4
38	BOLT CARRIAGE 3/8-16 x 1.75"	8024061	4	8024061	4
39	TUBE SPACER	830526	2	830526	2
40	BRACKET LIFT LINK	360246	2	360246	2
41	LINK LIFT RIGHT	360276	1	360276	1
42	LINK LIFT LEFT	360277	1	360277	1
43	WASHER FLAT 3/8 SAE	8172009	14	8172009	14
45	SPRING EXTENSION	360154	2	360154	2
46	ROD LIFT	360271	2	360271	2
47	LYNCH PIN 3/16"	520004	2	520004	2
48	HANDLE UPPER AE	360239	1	360239	1
50	NUT LOCK 5/16-18	8160002	14	8160002	14
51	CARRIAGE BOLT 5/16-18X1.50	8024042	2	8024042	2
52	HANDLE LIFT	360167	1	360167	1
53	CLEVIS PIN 3/8" X 1.625	520119	2	520119	2
54	BAIL CLUTCH	360268	1	360268	1
55	CABLE CLUTCH ASSY	360119	1	360119	1
56	SCREWCAP #10 - 24 X 0.625	8059135	1	8059135	1
57	WASHER #10 SAE FLAT	8172005	2	8172005	2
58	RUBBER BUMPER 5/16" STUD	360263	2	360263	2
68	TY-WRAP	900407	9	900407	9
72	CARRIAGE BOLT 5/16-18X1.75	8024043	2	8024043	2
76	WASHER 1/4 FLAT CUT	8171002	9	8171002	9
79	LABEL TANK INSTRUCTIONS AE	360262	1	360262	1
80	NUT LOCK 1/2 - 13 THIN HGT	8161044	2	8161044	2
82	HANDLE LOWER RIGHT WA	360270	1	360270	1
83	HANDLE LOWER LEFT WA	360269	1	360269	1

ITEM NO.	DESCRIPTION	AE400H Part No.	QTY	AE450 Part No.	QTY
84	LABEL LIFT HERE	360187	4	360187	4
85	LABEL WARNING WEIGHT	360188	2	360188	2
86	FRAME REAR WA	360267	1	360267	1
87	NUT FLANGE 1/4-20	900453	4	900453	4
88	WHEEL SPACER AE	360275	2	360275	2
89	LOCKNUT #10-24	8164005	1	8164005	1
91	TIRE & WHEEL 8"	360261	2	360261	2
92	BOLT SHOULDER 3/8 x 1/2"	830528	6	830528	6
93	BOLT SHOULDER 3/8 x 1"	360152	4	360152	4
95	BOLT SHOULDER 3/8 x 2"	360153	2	360153	2
96	WASHER 1/2" SAE ZP	8172011	2	8172011	2
97	BUSHING SHOULDER NYLON 3/8 ID	360175	8	360175	8
98	NUT LOCK 1/4x 20 THIN	8160001	1	8160001	1
99	SCREW CAP 1/4 - 20 x 1 1/2"	8041008	1	8041008	1
100	HARNESS WIRE AE	360199	1	360199	1
101	BRACKET MOUNT SWITCH	430141	1	430141	1
102	SWITCH ON-OFF	500281	1	500281	1
103	NUT - PAL 3/8	360218	2	360218	2
104	GRIP LEVER	500181	2	500181	2
105	NUT LOCK 5/16 -18 THIN	8161041	10	8161041	10
107	PLASTIC LANYARD	360243	2	360243	2
109	CAP WATER TANK	360256	1	360256	1
110	KNOB 5/16" NUT INSERT	400339	2	400339	2
111	WASHER - EXTENSION	810652	2	810652	2
112	SPRING	400332	2	400332	2
113	90° PLASTIC ELBOW 3/4"	360283	1	360283	1
114	VALVE SHUT OFF 3/4"	360250	1	360250	1
116	PLUG CAP 1" TUBE	890132	2	890132	2
117	RETAINER 3/8"	360279	2	360279	2
118	LOOP FOLDING HANDLE	350138	2	350138	2

18 PARTS DRAWING

AE400H & AE450



ITEM NO.	DESCRIPTION	AE400H Part No.	QTY	AE450 Part No.	QTY
1	FRAME ASSEMBLY	360273	1	360273	1
4	BEARING 3/4" PILLOW BLOCK	350133	4	350133	4
5	SCREWCAP 3/8-16 x 1 1/2	8041052	13	8041052	13
6	FRONT AXLE 3/4"	360259	1	360259	1
7	KEY SQUARE 3/16 x 3/16 x 1.25	9201080	1	9201080	1
8	WHEEL 10.5" SEMI PN. W3/4" KEYED HUB	360157	2	360157	2
9	FENDER WASHER 5/16"	8172020	2	8172020	2
10	WASHER LOCK 5/16 TWISTED TOOTH	430298	2	430298	2
11	SCREWCAP 5/16-18 x 1"	8041028	2	8041028	2
12	GUARD DIFFERENTIAL AE	360248	1	360248	1
13	SCREW SELF TAP 1/4 x 1/2"	8122080	2	8122080	2
14	JACKSHAFT AERATOR	360253	1	360253	1
15	BEARING 1" PILLOW BLOCK	810700	2	810700	2
16	NUT LOCK 3/8-16	8160003	15	8160003	15
17	COILED PIN 1/4" - 2.25" LONG	360257	5	360257	5
18	PULLEY 8" x 1" BORE W/ HOLE	360237	1	360237	1
19	SPOCKET 16Tx 1" BORE	360260	2	360260	2
20	BELT 4L x 43" POWER RATED	360120	1	360120	1
21	CHAIN #40 x 94 PITCH O-RING (WHEEL)	360115	1	360115	1
22	CHAIN #40 x 76 PITCH O-RING (TINE)	360114	1	360114	1
23	PULLEY IDLER 4.5"	500270	1	500270	1
24	ARM IDLER WA	510199	1	510199	1
25	BRACKET MOUNT IDLER	360121	1	360121	1
26	BELT FINGER FRONT AE	360219	1	360219	1
27	KEY SQ. 3/16" X 2"	9201086	2	9201086	2
28	BOLT SHOULDER 1/2 x 1	500114	1	500114	1
29	SPROCKET IDLER 17T x 5/8" BORE	360116	2	360116	2
30	SPACER SPROCKET IDLER 2.5"	360123	1	360123	1
31	SCREW CAP 1/2 - 13 x 4	8041106	1	8041106	1
32	SPACER SPROCKET IDLER 1.175"	360124	1	360124	1
33	SCREW CAP 1/2 - 13 x 3"	8041102	1	8041102	1
43	WASHER FLAT 3/8 SAE	8172009	12	8172009	12

ITEM NO.	DESCRIPTION	AE400H Part No.	QTY	AE450 Part No.	QTY
44	SCREWCAP 3/8 -16 x1	8041050	2	8041050	2
49	FLAT WASHER 1/2"	8171006	4	8171006	4
50	NUT LOCK 5/16-18	8160002	55	8160002	55
55	CABLE CLUTCH ASSY	360119	1	360119	1
59	SPACER TINE SPROCKET END	360108	1	360108	1
60	PULLEY ENGINE	360117	1	360117	1
61	SPROCKET 42 T	360106	1	360106	1
62	SPACER - TINE SPROCKET 1.468	360272	3	360272	3
63	CAP SCREW 5/16-18 x 2.50"	8041034	3	8041034	3
64	TINE PLATE	360101	8	360101	8
65	TINE	360100	24	360100	24
66	SPACER - NUT RIGHT END	360266	1	360266	1
67	SPACER - BETWEEN TINE ASSEMBLIES	360265	3	360265	3
69	HEAVY WASHER TINE ASSY	830113	1	830113	1
70	WASHER LOCK 7/8" INTERNAL	350154	1	350154	1
71	NUT JAM 7/8 -14 (Torque 100 ft.lbs)	350155	1	350155	1
72	CARRIAGE BOLT 5/16-18X1.75	8024043	48	8024043	48
73	SHAFT TINE DRIVE	360102	1	360102	1
74	SCREW CAP 5/16 - 18 x 1.5"	8041030	4	8041030	4
75	WASHER FLAT CUT 5/16	8171003	9 OR 10	8171003	9 OR 10
77	LABEL HOT ENGINE	400268	1	400268	1
78	LABEL DANGER GUARD	900327	2	900327	2
80	NUT LOCK 1/2 -13 THIN	8161044	2	8161044	2
81	SPACER BEARING/SPROCKET 0.375 THK	360109	1	360109	1
90	ENGINE	360278	1	360127	1
94	LOCKNUT 3/8" - 16 THIN HGT	8161042	1	8161042	1
106	WASHER 1.062" ID X 1.75 OD	8172021	4 OR 5	8172021	4 OR 5
108	CHAIN MASTER LINK	360205	2	360205	2
115	SPROCKET 35 TOOTH	360252	1	360252	1
119	SPACER - TINE PLATES	360105	4	360105	4
120	TINE ASSY (INCLUDES 50,64,65,72,&119)	360197	1	360197	1
121	RUBBER PAD 1/8" TK X 1/2" W	350310	1	350310	1

17 MAINTENANCE

Use only a qualified mechanic for any adjustments, disassembly or any kind of repair .

WARNING: TO AVOID PERSONAL INJURY, ALWAYS TURN MACHINE OFF, MAKE SURE ALL MOVING PARTS COME TO A COMPLETE STOP.

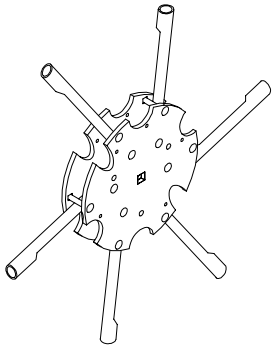
DISCONNECT SPARK PLUG WIRE BEFORE SERVICING UNIT.

ENGINE: See engine manufacturer's service instructions.

REPLACE ALL GUARDS, BEFORE STARTING ENGINE.

USE ONLY BILLY GOAT ORIGINAL EQUIPMENT PARTS FOR REPLACEMENT AND REPAIR

TINE ROW KIT 360197



Complete tine row set for replacement of one complete row of tines. Includes mounting plates, spacer, and all hardware.

TINE KIT 360100

Individual coring tine for replacement of worn or broken tines.

Tip!!!

Spraying tines with a rust preventing lubricant can increase tine life and allow for easier replacement of worn or damaged tines.

TINE REEL REMOVAL AND TINE ROW REPLACEMENT

TINE REEL REMOVAL

NOTE: Tine reel removal is only necessary to replace an entire tine row or for other major unit maintenance. Individual tines can be replaced by following the INDIVIDUAL TINE REPLACEMENT instructions.

1. Wait for engine to cool and disconnect spark plug.
2. Remove the top guard by removing the four nuts, two on each side, that secure it to the frame.
3. Release the tension on the chain. See CHAIN TENSION ADJUSTMENT in this manual.
4. Remove the four bolts and nuts, two on each side, holding the tine reel bearings in place. BE CAREFUL the tine reel is heavy and sharp. Take precautions to not allow it to fall when the bearing bolts are removed.
5. Lift the reel up and to the side to remove it from the drive chain.
6. See TINE ROW REPLACEMENT for instructions on maintenance.
7. To reinstall the reel follow the above steps in reverse.
8. Replace the guard and reinstall the four nuts that secure it in place.

TINE ROW REPLACEMENT

1. Wait for engine to cool and disconnect spark plug.
2. Remove the top guard by removing the four nuts, two on each side, that secure it to the frame.
3. Remove the tine reel per the TINE REEL REMOVAL instructions.
4. Remove the nut at the end of the tine reel shaft that secures the tine rows in place.
5. Remove the tine rows and spacers as necessary to replace the defective part. Be sure to note the order in which the spacers were removed for later reassembly.
6. Reassemble the tine reel in the exact order that it was disassembled.
7. Tighten the nut that secures the tine rows and spacers on the shaft. Torque the nut to a minimum of 100 ft.lbs. Check that all of the tine rows are tight by attempting to move them by hand.
8. Reinstall the tine reel per the TINE REEL REMOVAL instructions above.
9. Reset the tension on the chain.
10. Replace the guard and reinstall the four nuts that secure it in place.

INDIVIDUAL TINES REPLACEMENT

1. Wait for engine to cool and disconnect spark plug.
2. Loosen but do not remove the outermost nut and carraige bolt that secure the damaged or worn tine.
3. Loosen and remove the innermost nut and carraige bolt that hold the tine in the reel.
4. Use a small prybar and push the tine plates apart slightly to slide out the tine to be replaced.
5. Slide the new tine in place and secure with the innermost nut and carraige bolt. Tighten completely.
6. Retighten the outermost nut and carraige bolt to completely secure the new tine.
7. Repeat as required to replace all damaged or worn tines.

NOTE: Tines are a normal wear item and should be inspected regularly for signs of wear or damage.

17 MAINTENANCE

BELT AND CHAIN TENSION ADJUSTMENT

ADJUSTING BELT TENSION-

1. Remove the top guard (item 3) by removing the four nuts(item 87), two on each side, that secure it to the frame.
2. Locate the top of the belt idler assembly where the clutch cable (item 55) is secured in place. A properly tensioned belt should stretch the idler spring (loacted next to the idler pulley) between 1/4" - 3/8" when the clutch bail (item 54) is held in the drive position.
3. Using a 1/2" wrench loosen the two nuts that secure the cable (item 55) in place.
4. TO INCREASE belt tension adjust these two nuts so that the cable (item 55) is secured in place with an additional 1/4" of the threaded adjuster at the top of the assembly.
TO DECREASE belt tension adjust these two nuts so that the cable (item 55) is secured in place with 1/4" less of the threaded adjuster at the top of the assembly.
5. Replace the guard (item 3) and reinstall the four nuts (item 87) that secure it in place.
6. Run the unit to test your adjustment. Repeat as necessary to achieve proper adjustment. A properly adjusted belt will pull the unit up a 15 degree slope when clutched without any belt slip, and will declutch and stop the unit completely when the clutch is released.

NOTE: Never release the clutch on a slope. The unit is heavy and will free wheel down hill.

NOTE: A worn belt will not allow for proper adjustment and must be replaced.

ADJUSTING CHAIN TENSION-

1. Remove the top guard (item 3) by removing the four nuts(item 87), two on each side, that secure it to the frame.
2. Locate the bolt (item 31, 33) and nut (item 80) that hold each idler sprocket to the frame of the unit. One idler sprocket sets tension on the wheel drive chain and one sets tension on the tine drive chain.
3. Loosen the bolt and nut and slide the idler sprocket (item 29) in the desired direction.
INCREASED TENSION: Slide the sprocket to the rear.
DECREASED TENSION: Slide the idler sprocket to the front.
4. Tighten the bolt and nut to secure the sprocket in place.
5. Replace the guard and reinstall the four nuts that secure it in place.
NOTE: Over tensioning the chain will cause premature chain and sprocket wear. DO NOT OVER TENSION THE CHAIN. A properly tensioned chain will have slack of 1/4"-3/8" when moved by hand.

DRIVE BELT REPLACEMENT

1. Wait for engine to cool and disconnect spark plug.
2. Remove the top guard by removing the four nuts, two on each side, that secure it to the frame.
3. Slide the belt off of the engine drive pulley, and off of the jackshaft drive pulley.
4. Continue sliding the belt along the jackshaft to the right jackshaft bearing away from the pulley and sprockets.
5. Using a 9/16" wrench, remove the two bolts and nuts that hold the jackshaft bearing in place.
6. Carefully lift the jackshaft up until the belt can be slid out underneath the bearing.
7. Slide the new belt in place over the jackshaft.
8. Replace and tighten the bolts and nuts holding the jackshaft bearing in place. Be sure that the jackshaft is aligned straight across between both bearings.
9. Slide the belt along the jackshaft and over both engine and jackshaft pulleys. Be sure the idler pulley is positioned on the flat side of the belt.
10. Check proper belt tension. See BELT TENSION ADJUSTMENT in this manual.

CHAIN REPLACEMENT

NOTE: This procedure will work to change the wheel drive chain or the tine drive chain.
1. Wait for engine to cool and disconnect spark plug.
2. Remove the top guard by removing the four nuts, two on each side, that secure it to the frame.
3. Roll the unit until the master link of the chain that you want to replace is exposed near the jackshaft sprocket.
4. Release the tension on the chain. See CHAIN TENSION ADJUSTMENT in this manual.
5. Using a screwdriver or similar device remove the spring clip that secures the master link in the chain.
6. With the master link removed unwind the chain from the two sprockets that it connects.
7. Carefully string the replacement chain around the same two sprockets and reconnect it with the new master link provided with your replacement chain.
8. Re set the tension on the chain.
9. Replace the guard and reinstall the four nuts that secure it in place.

ENGINE MUST BE LEVEL WHEN CHECKING OR FILLING OIL

Maintenance Schedule Follow these hourly maintenance intervals.

Maintenance Operation	Every Use (Daily)	Every 25 hrs	Every 50 hrs
Engine (See Engine Manual)			
Check engine oil	●		
Check gear reduction oil level		●	
Grease bearings (See Lubrication)			●
Oil chains (See Lubrication)		●	
Inspect for loose, worn, or damaged parts		●	
Throughly clean all debris from unit and tine reel.	●		
Inspect belt			●
Check tine reel nut torque. Torque to minimum 100 ft.lbs			●

20 TROUBLESHOOTING

Before Requesting Service Review These Suggestions

Problem	Possible Cause	Solution
Engine stalls or labors when aerating.	Working on too steep a slope. Not enough oil in the engine.	Work at 45 degrees to the slop moving up and down instead of across. Check and add engine oil.
Abnormal vibration.	Damaged or missing tines. Loose handle bolts. Loose engine bolts	Stop work immediately. Replace any damaged or missing tines. Tighten all loose bolts and nuts.
Engine will not start.	Stop switch off (Honda only). Throttle in off position. Engine not in full choke position. Out of gasoline. Bad or old gasoline. Spark Plug wire disconnected. Dirty air cleaner. Engine oil level too low (Honda only).	Check stop switches, throttle, choke position and gasoline. Connect spark plug wire. Clean or replace air cleaner. Check and fill engine oil. Contact a qualified service person.
Engine is locked, will not pull over.	Debris locked against reel, or drive pulleys. Engine problem.	Pull spark plug wire and remove debris. Contact an engine servicing dealer for engine problems.
Engine is making loud noise or squealing.	Gear reduction oil level is low.	Check and add oil according to engine owners manual.
Unit does not move when clutch is engaged.	Belt drive out of adjustment. Work drive belt. Loose or damaged chain or sprockets. Loose or damaged pulleys. Damaged or broken clutch cable.	See maintenance on page 7 of this manual. Contact a qualified servicing dealer.

ENGINE

ENGINE	HORSEPOWER	MODEL NO.	NO LOAD RPM
HONDA	4.0	GX120K1HX2	3700
BRIGGS	5.5	1273520049E1	3700

When servicing the engine refer to specific manufacturers engine owner's manual. All engine warranty is covered by the specific engine manufacturer. If your engine requires warranty or other repair work contact your local servicing engine dealer. When contacting a dealer for service it is a good idea to have your engine model number available for reference(See table page above). If you can not locate a servicing dealer in your area you can contact the manufacturers national service organization.

To contact:

American Honda: 800-426-7701

Briggs & Stratton: 800-233-3723

LUBRICATION

BEARINGS-

1. Remove the top guard by removing the four nuts, two on each side, that secure it to the frame. NOTE: Guard must be removed to lubricate the jackshaft bearings only. All other bearings can be lubed without removing the guard.
2. Lubricate all 6 bearings using a pressurized grease gun with a standard lithium based grease.
3. Wipe any excess grease off of all bearings and fittings after each lubrication.
4. Replace the guard and reinstall the four screws that secure it in place.

CHAINS-

1. Remove the top guard by removing the four nuts, two on each side, that secure it to the frame.
2. Apply a light coat of No. 30 Oil or a penetraing chain lubricant to keep the chain clean and in good running order.
3. Replace the guard and reinstall the four screws that secure it in place.

NOTE:

If machine is cleaned with a pressure washer the chains and bearings should be lubricated after each cleaning.

22.1 Engine Service and Warranty

Contact your nearest engine manufacturer's authorized servicing dealer. (See above)

21 *Serial Plate*

Record your machine model, serial number and date-of-purchase and where purchased

BILLY GOAT INDUSTRIES.INC

1803 S. Jefferson
Lee's Summit,
MO 64062 / USA
Tel (816) 524-9666
Fax (816) 524-6983

CE

L_{WA}

95 dB

Model _____ Serial No. _____

Unit(Weight) _____ lbs. _____ kg

Engine Power _____ kW _____ rpm

Purchase Date _____ ***Purchased from*** _____

WARRANTY PROCEDURE

Should a Billy Goat Machine fail due to a defect in material and/or workmanship, the owner should make a warranty claim as follows:

-The Machine must be taken to the dealer from whom it was purchased or to an authorized Servicing Billy Goat Dealer.
-The owner must present the remaining half of the Warranty Registration Card, or, if this is not available, the invoice or receipt.
-The Warranty Claim will be completed by the authorized Billy Goat Dealer and submitted to their respective Billy Goat Distributor for their territory. Attention: Service Manager. Any parts replaced under warranty must be tagged and retained for 90 days.
-The distributor service manager will sign off on the claim and submit it to Billy Goat for consideration.
-The Technical Service Department at Billy Goat will study the claim and may request parts to be returned for examination. Billy Goat will notify their conclusions to the distributor service manager from whom the claim was received.
-The decision by the Quality / Service department at Billy Goat to approve or reject a Warranty claim is final and binding.

Note: To process a Warranty Claim, it is necessary to quote the Model & Serial Number which are printed on the Billy Goat Serial Plate (See owner's manual).

BILLY GOAT

BILLY GOAT INDUSTRIES INC.
1803 S.W. JEFFERSON / LEE'S SUMMIT, MO 64082-2312 / USA
PHONE: 816-524-9666 FAX: 816-524-6983 www.billygoat.com